Department of Computer Science

ANNUAL REVIEW 2009

A summary of the activities of the Department in 2009
# TABLE OF CONTENTS

ABOUT US ..................................................................................................................................... 2
  Overview of the Department ....................................................................................................... 2
  Contact Details ............................................................................................................................ 2
HIGHLIGHTS ................................................................................................................................ 3
  Initiatives ..................................................................................................................................... 3
  Awards and Recognition ............................................................................................................. 3
STAFF ............................................................................................................................................. 4
  Staff of the Department ............................................................................................................... 4
  Professional Activities ................................................................................................................ 5
  University Activities ................................................................................................................... 7
  Staff Development ...................................................................................................................... 8
VISITORS ....................................................................................................................................... 9
  Hosted Visitors ............................................................................................................................ 9
  Colloquia ..................................................................................................................................... 9
RESEARCH .................................................................................................................................. 10
  Research Laboratories ............................................................................................................... 10
  Research Funding ...................................................................................................................... 11
  Editorships and Conference/Workshop Organisation ................................................................ 12
  Publications ............................................................................................................................... 12
  Other Conferences, Workshops and Excursions ....................................................................... 16
  Industrial Collaboration ............................................................................................................ 17
  Advisory Board ......................................................................................................................... 18
TEACHING .................................................................................................................................. 19
  Postgraduate Students ............................................................................................................... 19
  The Information Technology Programme ................................................................................. 22
FACILITIES .................................................................................................................................. 24
  Equipment .................................................................................................................................... 24
ABOUT US

Overview of the Department

Administratively and academically, the department is in the Faculty of Science at The University of Cape Town.

From a teaching perspective, we offer the following fulltime programmes:

- Bachelor of Science - a 3-year undergraduate degree
- Bachelor of Science Honours - a 1-year postgraduate degree
- Masters in Computer Science (MSc/MPhil) - a 2-year research training degree
- Masters in Information Technology (MSc/MPhil) - a 2-year conversion course
- PhD in Computer Science - a 3-year research degree

Our research is conducted largely within the auspices of seven research groupings or laboratories:

- Advanced Information Management (AIM)
- Advanced Telecommunications Research (ATR)
- Collaborative Visual Computing (CVC)
- Data Network Architectures (DNA)
- Digital Libraries (DL)
- High Performance Computing (HPC)
- Information and Communication Technology for Development (ICT4D)

Contact Details

Physical Address:

317 Computer Science Building
18 University Avenue
Upper Campus
UCT
Rondebosch
Cape Town
7701

Postal Address:

Department of Computer Science
University of Cape Town
Private Bag
Rondebosch
7701
South Africa

Telephone: +27 21 650 2663
Fax: +27 21 650 3551
Website: http://www.cs.uct.ac.za/
E-mail: dept@cs.uct.ac.za
HIGHLIGHTS

Initiatives

The Department of Computer Science aims to be the premier computer science department within Africa and make contributions to the discipline at a global level. To that end, we are constantly evolving our undergraduate, postgraduate and research capabilities, to produce and attract good students and staff to UCT. Some of the most recent initiatives are:

The Hasso-Plattner Institute Centre in ICT4D (ICT for Development) was founded as a focal point for researchers who wish to create ICT appropriate to the needs of the developing world. The Centre is now multi-disciplinary and, under the Directorship of Prof Gary Marsden, explores ways of bringing ICT solutions to technologically impoverished regions. The Centre is already making a name for itself globally, and Profs Marsden and Blake were among 25 world leaders in the field invited to the Workshop on Computer Science and Global Development (USA) where the new ACM SIGDEV was created.

The Industrial Advisory Board was reconstituted with a number of senior executives from the IT industry and from local government invited to participate. A very successful inaugural meeting of the new Advisory Board was held in November under the chairmanship of Greg Reis from BSG. Our BSc(Hons) in Computer Science, and our Business Science Honours in Computer Science, are now accredited by the British Computer Society. Advisory Board input and our regular accreditation visits from the BCS assist us in maintaining our high standards.

Dr Anne Kayem was appointed as a new senior lecturer in the department at the end of the year. Anne received her PhD in computer security from Queens University in Ontario, and subsequently joined the German Artificial Intelligence Research Centre before accepting the position at UCT.

The Department hosted the African leg of the Global Game Jam in January. This event involved teams creating computer games over a weekend which were then uploaded to the Web for the international gaming community to enjoy and to rate. The games produced by our three student teams were very well received, as can be seen at www.globalgamejam.org.

The department mounted a new Honours module on Information and Communications Technology for Development, covering computer science research and development for third world nations.

Awards and Recognition

Three academic members of staff were promoted in recognition of their outstanding overall contribution to teaching, research, leadership and social responsiveness. Drs Gain and Suleman were promoted to Associate Professor and Assoc. Prof. Gary Marsden was promoted to full Professor. Prof Pieter Kritzinger retired at the end of the year and became the first Emeritus Professor of Computer Science at UCT. Dr Audrey Mbogho was granted tenure, and Dr Andrew Hutchison from T-Systems was re-appointed as Adjunct Professor in Computer Science.

Prof Gary Marsden received the Distinguished Teachers Award, the highest award made by UCT in recognition of excellence in teaching. Also a recipient of the Apple Distinguished Teachers Award, Gary’s superb lecturing continues to receive exceptional praise from students, as well as researchers who attend his tutorials at international conferences; he is also well known worldwide as author of the leading textbook on mobile interaction design.

Terri Grant and Claudia Kalil of UCT’s Professional Communications Unit received a CHED Award for their Computer Science 3 module. This involved scenario-based learning using UCT’s ICT infrastructure renewal project, SupaTsela, with students presenting their findings in reports and oral presentations to external experts.
STAFF

Staff of the Department

Head of Department
- Associate Professor Sonia Berman, BSc (Hons) Rhodes; MSc, PhD UCT.

Professors
- Edwin Blake, BSc (Hons) Wits PhD London
- Pieter Kritzinger, MSc (Eng) Wits PhD Waterloo
- Ken MacGregor, BSc Strathclyde MSc Glasgow

Adjunct Professors
- Andrew Hutchison, MSc HDE UCT PhD Zurich

Associate Professor
- Gary Marsden, BSc (Hons) MSc PhD Stirling

Senior Lecturers
- Antoine Bagula, MEng Louvain, MSc Stellenbosch, PhD KTH
- James Gain, MSc Rhodes PhD Cantab
- Michelle Kuttel, MSc, PhD UCT
- Hanh Le, PhD UTS
- Patrick Marais, MSc UCT DPhil Oxon
- Audrey Mbohgo, MSc PhD CUNY
- Hussein Suleman, MSc UDW PhD VPI&SU

Lecturers - Academic Development Programme
- Gary Stewart, BSc (Hons) UCT

Computer Systems Managers
- Ademola Freddy Adekayode HND (Bida), PGD in computer Science (Bauchi) PGDM (Cape Town), MCP, ITSM – Systems Administrator (Windows)
- Craig Balfour BSocSci Cape Town, BA (SS) Hons UNISA – Systems Administrator (Unix)

Administrative Officer
- Salegga Valley

Administrative Assistant - Research
- Eve Gill

Senior Secretary
- Jane Wright

Receptionist / Laboratory Assistant
- Bernie Sam
Professional Activities

A Bagula

- Reviewer for the Optical Society of America and the IEEE, and for the journal Computer Networks.
- Programme committee member for international conferences such as INDS2009 (Austria), NGWMN 2009 (Austria) and BROADCOM 2009 (Poland).
- Lectures and wireless training activities at ICTP-ITU.

S Berman

- Member of NRF Blue Skies Panel awarding research grants in IT and also of Blue Skies Moderation Panel awarding research grants across all disciplines.
- Member of NRF HICD Panel awarding research grants in IT for unrated researchers.
- Member of City of Cape Town/CHEC Focus Group on IT promoting collaboration in IT research and development for the city.
- Selection committee member, Professorship of Computer Science at the University of the Western Cape.

K MacGregor


P Kritzinger

- South African representative on the IFIP Technical Committee for Telecommunications.
- Reviewer for the NRF and the Engineering and Physical Sciences Research Council (Britain); and for conferences such as MASCOTS (London), Networking 2009 (Germany), and Practical Applications of Stochastic Methods (England).

J Gain

- Member of SIGGRAPH, ACM and the IEEE Computer Society
- Programme co-chair for Afrigraph 2009.

M Kuttel

- On sabbatical from January – June 2009.
- Reviewer for the following journals: Journal of Chemical Theory and Computation, Journal of Theoretical Biology and Carbohydrate Research.
- Trustee and member of the Scientific Board of the South African Computer Olympiad.
- Presented lectures at the Centre for High Performance Computing and the African Institute of Mathematical Sciences, and hosted a two week Winter School in High Performance Computing for science and engineering students.
H Le
- Patented wireless sensor network model in South Africa and internationally (patent pending).
- Member of the programme committee for Healthcom 2009 international conference.

P Marais
- Member of SIGGRAPH, ACM and IEEE Computer Society.
- President of Afrigraph (African Computer Graphics Association).
- Reviewer for ACM SIGGRAPH, IEEE Visualization, Afrigraph, IADIS Computer Graphics and Visualization, and SAICSIT conferences, and for SACJ and The Visual Computer journals.
- NRF Scholarships Committee member, awarding Masters and PhD scholarships nationally.

G Marsden
- Invited speaker, Munchner Kreiss ICT4D, Berlin (presentation to high-level German government and industrialist group who set national policies on various issues, in this case on ICT4D).
- Presented keynote talk at ESPRC meeting in Cambridge, UK, on Bridging the Global Digital Divide.
- Vice president of SAICSIT. Member ACM SIGCHI.
- Board member of Cell-Life, an NGO promoting HIV/AIDS awareness.
- Reviewer for numerous local and international conferences and journals, and column editor for ACM Interactions.
- Computer Science Editor of the South African Computer Journal.
- Presented tutorial on mobile interaction design in Boston at the ACM CHI Conference.

H Suleman
- Elected to Senior Member of ACM
- Member of SAICSIT council
- Steering committee member of the National ETD project
- Commissioned to develop National Electronic Theses and Dissertations metadata repository and portal for South Africa by NRF
- African representative on the board of directors of the Networked Digital Library of Theses and Dissertations.
- Maintains the Bleek and Lloyd online collection of bushman drawings and notes, the website of the Sivuvile project that promotes Open Access in Southern Africa, and the BOINC server that hosts scientific projects in Africa (in collaboration with Africa@Home and funded by CERN).
- Reviewer for 15 local and international conferences and journals, including all major international conferences in the field of Digital Libraries.
- Successfully led a bid for the International Symposium on Electronic Theses and Dissertations (ETD2011) to be hosted in Cape Town in 2011.
University Activities

S Berman
- Information Technology Programme Convenor
- Member of Dean’s Advisory Committee
- Member of UCT’s Science Academic Development Programme Review Panel
- External examiner of Computer Science at Rhodes University (all courses), and of selected courses at UWC, Pretoria University and UNISA.
- Selection committee member for Statistics and Computer Science lectureships at UCT.

H Suleman
- Member of various selection committees in faculty
- Chair of transformation committee (and representative on associated University committees)
- Chair of readmissions appeal committee (and representative on associated Senate committee)

J Gain
- Serve on the CUES (Committee for University Education in Science) and the ICT Users Group
- Health and Safety Officer

M Kuttel
- Departmental Student Advisor and, in that role, formed part of the Faculty Examination Committee.

H Le
- Member of Faculty Library Committee

P Marais
- Served on BSc(IT) programme committee
- Member of Science Faculty IT Equipment committee
- Member of CUES (committee for university education in Science)

G Marsden
- ICT4D Centre: The Computer Science Department now has its first university accredited research centre in the form of the form of the ICT4D Research Centre. This centre has been set up to create an interdisciplinary group of research from across the university to look at how ICT technology may be used to aid development in Africa. The centre has run a series of seminars led by departments such as Information Systems, Centre for Educational Technology, Film and Media, and Computer Science. From March 2009, the centre has also hosted the Hasso Plattner Research School in ICT4D. This initiative supports African PhD candidates who are undertaking ICT4D research.
- Member of the faculty Marketing Committee.
- Member of the faculty Research committee.
- Student advisor
- Summer School Anniversary Committee; CET Advisory Board
Staff Development

M Kuttel

- Attended a number of the Emerging Researcher Programme seminars.

A Mbogho

- Attended several Emerging Researcher Programme workshops

The Vice Chancellor and Dean of Science with staff promoted in 2009. Drs. Hussein Suleman (far left) and James Gain (fourth from left) are from Computer Science. Absent: Prof. Gary Marsden.

- Terri Grant and Claudia Kalil, above, received a CHED Award from UCT for the Professional Communications module they teach Computer Science 3 students.
VISITORS

Hosted Visitors

- David Levin; February 14-21, 2009 University of Israel.
- Nic Bidwell (James Cook University),
- Jonathan Donner (Microsoft Research)
- Paola Cescutti and Roberto Rizzo from the University of Trieste, Italy.

Colloquia

The following visitors gave seminars in the Department:

- Speaker: Ian Tunbridge PhD Student, University of Cape Town
  Topic: "GPU Programming for Simulation"

- Speaker: J.P. Longmore- PhD Student, University of Cape Town

- Speaker: Prof David Levin, Tel Aviv University, Israel.
  Topic: Parameterization-free Projection for Geometry Reconstruction.

- Speaker: Dr. James Gain, the University of Cape Town
  Topic: Terrain Sketching.

- Speaker: Prof. Heinz Rüther, Emeritus Professor, Geomatics at the University of Cape Town,
  Topic: Visualisation and 3D Monitoring of African Cultural Heritage Sites and Landscapes

- Speaker: Dr Andrew Herbert, Microsoft Research Limited, Cambridge, UK

- Speaker: Juan-Pierre Longmore, the University of Cape Town
  Topic: Towards Realistic Interactive Sand: A GPU-based Framework

- Speaker: Mr Blaise Thomson, a PhD student from the University of Cambridge.
  Topic: The application of cognitive user interfaces to spoken dialogue systems

- Speaker: Dr Anne Kayem
  Topic: "Self-Adaptive Access Control".

- Speaker: Dr Zeyar Aung
  Topic: MatAlign - Precise Protein Structure Comparison by Matrix Alignment

- Speaker: Professor Eric Allender. Rutgers University, the State University of New Jersey
  Topic: Circuit Complexity meets the Theory of Randomness

- Speaker: Prof. Dr. Jürgen Sieck from the University of Applied Sciences Berlin (HTW Berlin).
  Topic: “Mobile Museum Information Systems - Potentials and Defiances of Mobile Devices”

Anyone wishing to join the departmental colloquium mailing list should email hussein@cs.uct.ac.za
RESEARCH

Research Laboratories

Advanced Information Management

http://aim.cs.uct.ac.za

Co-ordinator: Associate Professor S Berman. This laboratory deals with multiple facets of the information processing problem, exemplified by the following active research areas: databases; knowledge management systems; peer-to-peer computing; distributed computing and Web-based systems.

Advanced Telecommunications Research

http://www.cs.uct.ac.za/Research/ATR/

Co-ordinators: Dr A Bagula and Dr H Le. Topics of interest include Smart Networking using Cars, Robots, UAVs, Sensors, Actuators and RFID tag-enabled devices; Traffic and Network Engineering for Next Generation IP Networks and Overlay networks; Efficient Frequency Management using cognitive Radio; Pan African Research and Education Network Infrastructures and Bandwidth Limitation and Information Accessibility in Developing Countries; Distributed Healthcare Data Networks; and Mobile Applications for the Developing World.

Collaborative Visual Computing

http://www.cs.uct.ac.za/Research/CVC/

Co-ordinator: Professor E Blake. Topics of research include: Collaborative Virtual Environments; Usability and Human-Computer Interaction; Computer Graphics; Image Analysis applied to Medical Images; Virtual Reality and Behavioural Therapy; Allowing End-Users to Create Interesting Virtual Environments; Interaction with Mobile Computing Devices; Scalable Interfaces; and implications of these for Government Information Technology Policy. Special interests within the CVC lab include Socially Aware Computing, VR Methodology, Virtual Environments and the Geometry Interest Group.

Data Network Architectures

http://www.cs.uct.ac.za/Research/DNA/

Co-ordinator: Professor P Kritzinger. Work in the DNA group focuses on the specification and analysis of computer protocols and associated software as well as fixed line communication networks. The group’s main research interests lie in the security, correctness, performance analysis, design, specification and modelling of stochastic concurrent communicating systems (SCCS) in general, and telecommunication systems in particular.

Digital Libraries


Co-ordinator: Ass Professor H Suleman. Research areas covered within digital libraries include information storage and retrieval; multilingual retrieval; Web-based systems; scalable and flexible repositories; interoperability and protocols; component-based systems; Open Access; and cultural heritage preservation.
High Performance Computing

http://www.cs.uct.ac.za/Research/HPC/

Co-ordinator: Dr M Kuttel. This laboratory hosts investigations into all aspects of high performance and high throughput computing, including: parallel architectures and algorithms; scientific computing; high performance visualisation; large-scale information retrieval; high-performance digital archives; grid and volunteer computing; software optimization; and multi-core and GPU programming.

ICT for Development Centre

http://www.ict4d.cs.uct.ac.za/

(Director: Professor G Marsden). The UCT Centre in ICT for Development seeks to create ICTs that are appropriate for developing nations. To date, most innovation in ICT has been driven by the developed world to meet challenges originating from that context. This centre will design, create and evaluate technologies that address the needs of the developing world and the people who live there.

Sylvian Gitau shows guests the Snap-send-grab board at the opening of the Hasso-Plattner Institute.

Research Funding

<table>
<thead>
<tr>
<th></th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRF</td>
<td>746 131.00</td>
</tr>
<tr>
<td>URC</td>
<td>160 201.00</td>
</tr>
<tr>
<td>HPI</td>
<td>235 384.00</td>
</tr>
<tr>
<td>SANPAD</td>
<td>182 700.00</td>
</tr>
<tr>
<td>T-SYSTEMS</td>
<td>50 000.00</td>
</tr>
<tr>
<td>NRF INCENTIVE</td>
<td>200 000.00</td>
</tr>
<tr>
<td>COE THRIP</td>
<td>297 502.00</td>
</tr>
<tr>
<td>COE IND</td>
<td>358 999.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2 230 917.00</strong></td>
</tr>
</tbody>
</table>
Editorships and Conference/Workshop Organisation

J Gain
• Afrigraph 2009 programme co-chairperson

M Kuttel
• Organised the UCT-CHPC GPU workshop at CHPC national meeting in Sandton, 10-11 December, 2009.
• Helped with the organisation of the UCT-CHPC Algorithm Camp for school goers at UCT, 16-20 December, 2009.

P Marais
• Afrigraph 2009 organisation
• Siggraph 2009 - international Resources Committee

G Marsden
• Workshop on HCI for Development, Berkeley, California
• Co-organisor of Globi-comp 2009 conference.

Publications

Journals


Zawaira, Alexander, Marco Gallotta, Natasha Beeton-Kempen, Lauren Coulson, Patrick Marais, Michelle Kuttel and Johnathan Blackburn (2009) Exhaustive computational search of ionic-charge clusters that mediate interactions between mammalian cytochrome P450 (CYP) and P450-oxidoreductase (POR) proteins. *Computational Biology and Chemistry*.

**Conference Papers**


Conference Posters


Departmental Technical Reports


Other Conferences, Workshops and Excursions

M Kuttel
- Presented 3 talks at the American Chemical Society Fall 2009 National Meeting and Exposition Washington D.C., USA

P Marais
- Afrigraph 2009, Pretoria, Jan 2009

G Marsden
- Workshop on HCI for Development, Berkeley, California

A Mbogho
- Presented a paper at IADIS International Conference on Mobile Learning, Barcelona, Spain, 26-28 February 2009

J Gain
- Afrigraph 2009, Pretoria, Jan 2009
- ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games, Boston, Feb to Mar 2009
- Center for High Performance Computing Workshop, Johannesburg, Dec 2009
Industrial Collaboration

- Apple Computers: The Department is working with Apple to investigate how cell phones can be used as an education delivery platform.
- Black Ginger: The Department undertakes joint research and development projects covering parallel rendering algorithms and animation techniques with Black Ginger, a local animation and graphics company.
- BSG donated new prizes for the best Computer Science students, to be awarded annually. Recipients for 2009 are as follows: BSG Prize for Computer Science 2 to Neil Goldberg; BSG Prize for Computer Science 3 to Johannes Du Plessis; BSG Prize for Computer Science Honours to Julian Kenwood, and BSG Honours Project Prize to Richard Baxter and Zacharia Crumley.
- IBM: Established a LINUX Competency centre at UCT which is operated by the Computer Science Department. It is used for commercial and parallel computing projects.
- Microsoft Research: The Department is involved in projects with Microsoft research, which cover mobile communications and wireless technologies.
- Nokia Research: The Department undertakes research in the use of mobile technology in disadvantaged communities with Nokia.
- TELKOM, Nokia Siemens: The Department participates in the UCT TELKOM Centre of Excellence which is jointly sponsored by Nokia and Siemens. The area of research is broadband communications, convergence of wireless and wired networks and Telescience.
- T-Systems: The Department has a security research laboratory sponsored by T-Systems. Prof. Hutchison, who heads this research group and lectures in network security, is Head of telecommunication services at T-Systems.

The Merit Students Function, and Jason Brownbridge receiving the Best Honours Student Award from Gary Stocks of BSG.
Advisory Board

The department’s Advisory Board was reinstated in 2009. In the past this body had been instrumental in achieving many benefits for the department such as the COMPASS programme which funded IT study for underprepared scholars, UCT’s Information Technology Thrust, and curriculum innovations such as the introduction of a business course and professional communication modules. The Advisory Board consists of senior people from businesses, industries and local government that are associated with the Department. Its role is to give input on the relevance of our curriculum and research from an industry perspective, and to assist with strategic planning. In return, members have access to our students and our research, and the ability to guide us in producing graduates that meet industry needs.

At the inaugural meeting in November, an overview of the department was followed by formal adoption of the Advisory Board Charter. Discussions centred on ways of attracting more students to Computer Science so as to meet the serious marketplace shortage, as well as a number of curriculum matters. These ranged from content detail to strategies for maintaining our specialised degree programmes in Computer Games Design, Computer Engineering and Business Computing when the BSc moves away from programmes in 2010. The meeting was followed by an opportunity to view Honours student project demonstrations.

The Computer Science Advisory Board comprises all academic staff of the department as well as the following members:

- Greg Reis, BSG (Chair)
- Doug Batchelor, Microsoft
- Jo Beall, UCT (Deputy Vice Chancellor)
- Marc Bloch and Hilton Treves, Black Ginger
- Andrea Bohmert, Hasso Plattner Ventures Africa
- Kathy Driver, UCT (Dean of Science)
- Izak Janse van Rensburg, UCT (Head of ICT Services)
- Jo-ann Johnston, Cape Provincial Government
- Danie Kok, SAP Africa
- Jenny McKinnell, Cape IT Initiative
- Donovan Muller, Accenture
- Craig Saks, S1 Corporation
- Andre Stelzner, City of Cape Town
- Brendon Wilson, Standard Bank
TEACHING

Postgraduate Students

Graduates in 2009

PhD in Computer Science

- Kelleher, Justin. “Traceability in Software Engineering” (Gary Marsden)
- Vermeulen, Hendranus. “Activity Theory and Constructivism” (Edwin Blake)
- Tucker, Bill. “Softbridge: ICT4D” (Edwin Blake)
- Hultquist, Carl. “An Adjectival Interface for Procedural Content Generation” (James Gain)
- Balikuddembe, Joseph. “Managing economic value and uncertainty on software projects; an empirical study with the CASSE Framework” (Antoine Bagula)
- Osunmakinde, Isaac. “Computational Intelligent Systems: Evolving Dynamic Bayesian Networks” (Antoine Bagula)

MSc in Computer Science

- David Jacka "High-Level Control of Agent-based Crowds by means of General Constraints" (James Gain)
- Ming Ki Chong, (distinction) "Gesture Based Authentication" (Gary Marsden)
- Shikoh Gitau, “Information Sharing and NGOs” (Gary Marsden)
- Peter McMaho. “Accelerating Bioinformatics Applications using Reconfigurable Computers” (distinction) (Michelle Kuttel)
- Ashley Reid “Practical Fluid Dynamics for the Animation Industry Principal” (James Gain)
- Grace Kamulegeya “A Bluetooth Educational Content Distribution System Modelled on Service Oriented Architecture” (Gary Marsden and Michelle Kuttel)
- Alex Karpul “Emergent Communication: the Evolution of Simplistic Machines using Different Communication Types” (Anet Potgieter and Patrick Marais)
- Marlon Paulse “Data Replication and Update Propagation inXML p2p Data Management Systems” (distinction) (Sonia Berman)
- Nakashole, Ndadapandula, “A Hybrid Scavenger Grid Approach to Intranet Search” (distinction) (Hussein Suleman)
- Parker, Christopher P, “A lightweight interface to local Grid scheduling systems” (Hussein Suleman)
- Symington, Andrew, "A Hardware Testbed for Measuring IEEE 802.11g DCF Performance" (Pieter Kritzinger)

Masters in Information Technology

- Hector Jason, “Harnessing Open Sound Control for Networked Music in VST Systems” (K MacGregor)
- Mogomotsi Banabotlhe “System Requirements for Service Quality Appraisal System (SQAS) to be used in Commercial Banks by Blind Customers”
Honours in Computer Science

The department graduates the highest number of Honours qualifiers in the Faculty. Two students graduated with a BSc Honours in Information Technology and 30 students graduated with a BSc Honours in Computer Science. The latter is the degree which is accredited by the British Computer Society: these qualifiers must have obtained both BSc and Honours degrees in this department, and must moreover have obtained a high mark for their Honours project. There were also 2 students graduating with a Bachelor of Business Science Honours in Computer Science, our 4-year Commerce degree that is also accredited by the British Computer Society. Of these 34 Honours graduates, 11 obtained the degree with distinction.

The following is a list of all Honours projects with the students who were members of each project group.

1. A Highly Scalable Monitoring Tool for a Network of Wi-Fi Hotspots: Pheeha Machaka
3. Asset Tracking: Julian Hulme, Collin Murray
4. AudioEye: Jake Hazell, Dominic Nunes, Jonathan Page
6. CALJAX: Marc Bowes, Matthew Hirst, Suraj Subrun
7. Data MULES and ad hoc WMNs: Edmundo Chissungo, Xoluqobo Mkhwanazi
9. E-Gov for Water and Energy Conservation: Hilja Angula, Mogamed Ashiq Khan, Morthla Madisha
10. Electronic Health Care Monitoring System: Sena Allen, Gregory Chandran, Robert Koletka
11. Environmentally Aware Game Bots: Wesley King, Gina Morris, Michael Talbot
12. MXit Web Applications: Jared Baboo, Jason Wedepohl
13. Social Networks - GetCoffee.co.za: Lario Borges, Adrian Seady
14. Water Compression: Keegan Carruthers-Smith, Julian Kenwood, Min-Young Wu

New and Continuing Students in 2009

PhD in Computer Science

1. Simon Perkins, "Interpretation of 3D Spaces" (James Gain)
2. Chen Wei, "Volumetric Cloud Generation by Sketching" (James Gain and Patrick Marais)
3. Munier Parker, "Cellular Application Design" (Gary Marsden)
4. Jakkaphan Tangkumpien, "ICT in the Classroom" (Gary Marsden)
5. Andrew Maunder, "ICT4 Development" (Gary Marsden)
6. Ilda Ladeira, "Interactive Storytelling in Museums" (Gary Marsden)
7. Raymond Mugwanya, "Digital Learning Materials" (Gary Marsden)
8. Oluayo Boyinbode, "Efficient Wireless Sensor Networks" (Hanh Le)
9. James Lane, "Viewing Layered Surfaces through Animated Particles" (James Gain)
10. Rudolph Neeser, "Procedural Methods for the Modelling and Simulation of large Environments" (James Gain)
12. Mohammed Mustafa Ali, "Language-aware Multilingual Information Retrieval" (Hussein Suleiman)
13. Hisham Abdalla, "Improving Arabic-English Cross-language Information Retrieval by Exploiting Web Structure" (Hussein Suleiman)
14. Mongezi Ngindana, "Comparative Analysis of Bandwidth Limitation and Information Accessibility in Developing Countries" (Hussein Suleiman)
MSc in Computer Science

1. Anton Eicher, "Active Shape Model Segmentation of Brain Structures in MR Images of Subjects with FASD" (Patrick Marais and Michelle Kuttel)
2. Keri Woods, "Tissue Segmentation of the Cerebellum from MR Images" (Patrick Marais)
3. Marco Gallotta, "Development and validation of a visualization tool for predicting protein-protein interfaces" (Michelle Kuttel)
4. Duncan Clough, "LBM Liquid Simulation with Dynamic Objects on a GPU" (James Gain and Michelle Kuttel)
5. Johannes Jansen van Vuuren, "Visualization of Multi-Dimensional Solution Sets" (Michelle Kuttel and James Gain)
6. Christopher Moolenschot, "Emergence in Artificial Intelligence for Games" (James Gain and Anet Potgieter)
7. Flora Tasse, "Distributed Texture-based Terrain Synthesis" (James Gain and Patrick Marais)
8. Warren Russell, "Dynamic Real-Time Character Motion" (James Gain and Patrick Marais)
9. Jason Brownbridge, "GPU Accelerated Crowd Modelling" (James Gain and Patrick Marais)
10. Ian Tunbridge, "Coarse-grained Simulation of Protein-Protein Docking with Macro-molecular Crowding Using Graphics Processing Units" (Michelle Kuttel and James Gain)
11. Sebastian Wyngaard, "Simulations of Realistic Hair: Dynamics, Interactions and Parallelisation" (James Gain and Michelle Kuttel)
12. Graeme Smith, "Mobile Media Distribution" (Gary Marsden)
13. Thomas Reitmaier, "Digital Storytelling" (Gary Marsden)
14. Ian Saunders, "Interactive Tag Clouds" (Gary Marsden)
15. Sean Packam, "Bluetooth Media Distribution" (Gary Marsden)
17. Karodia, Ramone, "Usable 3D Graphical User Interface for an Augmented Reality Desktop with a Wiimote-Based Head and Finger Tracker" (Audrey Mbogho)
18. Marwan Mohammed Noor, "An end-to-end solution for complex open educational resources" (Hussein Suleman)
19. Stefano Rivera, "Digital Asset Management in a Content Management System" (Hussein Suleman)
20. Jorgina Paihama, "Meta-standardisation of Interoperability Protocols" (Hussein Suleman)
22. Nils Körber, "Enhancing Usability of Open Source Digital Repositories" (Hussein Suleman)
23. Kieran Sharpey-Schafer, "An Investigation and Evaluation of Possible Solutions for a National Patient Record in South Africa" (Hussein Suleman)

Masters in Information Technology (MIT)

The following list includes both students who are currently enrolled for coursework modules and those who have completed the coursework and are working solely on research.

1. Balfour, Craig (Sonia Berman)
2. Doyle, Gregory Earle (Audrey Mbogho)
3. Erasmus, Daniel (Edwin Blake)
4. Evans, Mathew Glen (Andrew Hutchison)
5. Eyal, Dror
6. Falcke, Dean
7. Fisher, Mario (Ken MacGregor)
8. Gordon, Marc
9. Gounden, Kevindhren (Gary Marsden)
10. Hebler, Norman
11. Hector, Jason Alexis (Ken MacGregor)
12. Idowu, Modupeola
13. Joseph, Asma
14. Koopman, Keith Malvern (Audrey Mbogho)
The Information Technology Programme

The Assessment Panel of the British Computer Society rated our BSc and Honours in Computer Science very highly. Our student intake from 2008 onwards will thus be accredited by the British Computer Society with CITP (Chartered IT Professional) and Partial CSci (Chartered Scientist) after graduating.

Information Technology is one of four programmes in the UCT BSc degree. The other three are BEES (Biological, Earth and Environmental Sciences); CMCS (Chemical, Molecular and Cellular Sciences); and MPSS (Mathematical, Physical and Statistical Sciences). Computer Science thus has its own programme, while the other three programmes involve several majors and departments each. Nevertheless the IT programme is comparable in size to the other programmes.

Students in the IT programme choose between six specializations or specially-constructed curricula: Applied Computing, Bioinformatics, Business Computing, Computer Engineering, Computer Games Design and Computer Science. While only one specialization is required, 6 qualified with two specializations. In 2009 there were 11 qualifying with Computer Games Design, 12 with Business Computing and 8 with Computer Engineering. Of the 45 graduates, 8 were placed on the Dean’s Merit List for excellent achievement, and 3 obtained the degree with distinction in Computer Science.

The programme as a whole comprised 288 students in 2009: 133 in first year, 94 in second year and 61 in final year. Of the final year students 34 graduated and 1 was excluded for lack of progress. The remainder continue their degree at UCT in 2010. There were many excellent results in the programme and altogether 36 IT students were placed on the Dean’s Merit List, having obtained a distinction as their aggregate for the year. The BSG Prize for the best Computer Science 2 student was awarded to Neil Goldberg, the BSG Prize for the top Computer Science 3 student went to Johan Du Plessis, the BSG Prize for the top Computer Science Honours student was awarded to Julian Kenwood, and the BSG Prize for the best Computer Science Honours project went to Zac Crumley and Richard Baxter.
Table 1: I.T. student data of 2009 compared to 2008

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>New intake into first year I.T.</td>
<td>71</td>
<td>79</td>
</tr>
<tr>
<td>No. BSc(I.T.) graduates</td>
<td>69</td>
<td>45</td>
</tr>
<tr>
<td>No. graduating with Distinction in Computer Science</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>No. Dean’s Merit List graduates in BSc(I.T.)</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Total No. Dean’s Merit List students in BSc(I.T.)</td>
<td>44</td>
<td>36</td>
</tr>
</tbody>
</table>

Table 2. Undergraduate and Honours Pass Rates.

<table>
<thead>
<tr>
<th>Course</th>
<th>Wrote</th>
<th>Passed</th>
<th>Percentage Passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC1010H</td>
<td>85</td>
<td>87</td>
<td>48</td>
</tr>
<tr>
<td>CSC1011H</td>
<td>30</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>CSC1015F</td>
<td>360</td>
<td>291</td>
<td>267</td>
</tr>
<tr>
<td>CSC1016S</td>
<td>183</td>
<td>134</td>
<td>130</td>
</tr>
<tr>
<td>CSC1018F</td>
<td>15</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>CSC2001F</td>
<td>134</td>
<td>127</td>
<td>99</td>
</tr>
<tr>
<td>CSC2002S</td>
<td>110</td>
<td>105</td>
<td>81</td>
</tr>
<tr>
<td>CSC2003S</td>
<td>40</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>CSC3002F</td>
<td>61</td>
<td>84</td>
<td>58</td>
</tr>
<tr>
<td>CSC3003S</td>
<td>69</td>
<td>93</td>
<td>53</td>
</tr>
<tr>
<td>CSC3020H</td>
<td>13</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>CSC4000W</td>
<td>33</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td>CSC4016W</td>
<td>3</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

Academic Development

The Department continues to run an Academic Development Programme (ADP/GEPS), designed to assist talented, but under-prepared, historically-disadvantaged students who do not meet the standard admissions criteria of the University. The students on the ADP programme enrol for a four-year BSc, which includes 2 years of ADP courses, followed by the regular CS2 and CS3 courses. In general, statistics show that 20-30% of students admitted to the ADP programme finally pass CS3. Given the disadvantage, on entry to UCT, of ADP students, we view this as a high rate of success.

Neil Goldberg with his trophy for best Maths/Computer Science student; and Marco Galotta, Google Ambassador and driving force behind the Algorithms Circle promoting Computer Science at schools.
FACILITIES

Equipment

The Department maintains a network of UNIX and Windows based systems which are available for use by senior and graduate students. First year computing facilities are provided by the Science Faculty. The value of the current senior/graduate equipment base exceeds R2M. The available equipment includes:

Servers

17 Machines running a variety of operating systems (Ubuntu Linux, FreeBSD, Microsoft Windows2003 Server) that provide Web, email, domain, file, print, research and other services to the department as a whole.

Workstations

Approximately 200 workstations running various flavours of the Unix and Microsoft Windows including 76 workstations running a dual boot configuration of Microsoft XP and Ubuntu Linux and 47 diskless network computers running Ubuntu Linux.

I/O Equipment

7 network laser printers, 2 high-resolution scanners and a range of digital cameras.

Science First Year Laboratory

The Department is the major user of 150 Windows PCs in this laboratory. The current undergraduate student-to-machine ratio is about 4.5:1, which needs to be improved.

Programs

The Department of Computer Science is a paid-up subscriber to the Microsoft Developer Network Academic Alliance program. The program allows the department and registered Computer Science students easy access to software from Microsoft.

Free and Open Source Software

The Department makes extensive use of open source software, which is available at no cost, primarily under the GPL and BSD licenses. The types of software employed range from operating systems, to network infrastructure services, to word processing and typesetting suites.

Our Games Design degree in the Sunday Times, and Global Game Jam entrants in action in our Senior Laboratory.